

The Knowledge Bank at The Ohio State University

Ohio State Engineer

Title: D. D. T. Insecticide

Issue Date: 1945-02

Publisher: Ohio State University, College of Engineering

Citation: Ohio State Engineer, vol. 28, no. 3 (February, 1945), 9, 20, 28.

URI: <http://hdl.handle.net/1811/36126>

D. D. T. INSECTICIDE

By THOMAS H. WILSON

D.D.T.—short for dichloro-diphenyl trichloro-ethane—was first synthesized by Othmar Zeidler, a young German chemistry student in 1874. Zeidler did not even suspect the insecticidal value of the product which he had synthesized. His product gathered dust until about seven years ago one Paul Muller, of J. R. Geigy of Basle, Switzerland, discovered the amazing insecticidal qualities of D.D.T. during the routine testing of a number of formulae.

D.D.T., $\text{CCl}_3\text{CH}(\text{C}_6\text{H}_4\text{Cl})_2$, is a white crystalline powder, practically odorless. It has a low volatility and is practically insoluble in water, however it dissolves readily in most organic solvents.

D.D.T. is moderately toxic when taken internally and large dosages have been found to be cumulative in experimental animals. The powder form of D.D.T. is not absorbed by the skin and is not irritating. In solution, however, it is absorbed by the skin and is toxic, especially if the solvent is readily absorbed.

Many workers have found that the raw material, D.D.T., is ineffective and have concluded that D.D.T. does not have the properties commonly given to it. Actually D.D.T. is the active ingredient in mixtures which contain only 3 to 10 percent of the pure compound. "Gesarol" and "Neocid" (trade names of a series of mixtures by Geigy) are such mixtures. "Gesarol" mixtures are used in combating insects affecting plants and "Neocid" mixtures are used in combating insects which affect man and animal.

The most spectacular results obtained with D.D.T. compositions so far have been on flies. A report from Switzerland states that walls and ceilings of stables which had been sprayed with a "Neocid" mixture containing 0.05 percent D.D.T. remained free from flies for a month. In cases where the concentration of the mixture was increased so as to leave a visible deposit on the walls and ceiling, a deadliness to flies remained for as long as three months. It was found that flies have delicate nerve receptors on the tips of their legs and that they were permanently affected just by walking over a deposit of "Neocid" which might even be invisible to the eye. Although they will not die instantly, there is no escape for them. As D.D.T. does not possess a

quick "knock-down" for flies it is probable that it will be mixed with pyrethrum or some such substance which does possess a quick "knock-down" for household sprays after the war.

D.D.T. is both a stomach and a contact poison. This claim, made by Geigy of Switzerland, was found hard to believe by American scientists. This is understandable when it is recognized that of 3000 synthetic insecticides tested only sodium flouride and D.D.T. possessed both capabilities.

D.D.T. compositions have been found effective for removing fleas from dogs and cats also furnishing future protection against fleas for some time. A kerosene solution of 5 percent D.D.T. sprayed on beds has been reported effective against bed bugs for as long as 300 days. Ants, German and American varieties of the cockroach, chiggers, moths, mosquitoes, and silverfish are some of the common insects found susceptible to D.D.T. However, it is not claimed that D.D.T. is a "kill-all." At present no particular promise is shown against the Mexican Bean Beetle, certain plant lice, the Red Spider, the cotton Boll Weevil, the grasshopper, and a few other insects. Also the D.D.T. compositions do not kill eggs, but their effectiveness is so long lived that the insect is killed as soon as it is hatched.

At present the armed services are using all the D.D.T. available and it is not expected that any will be available for civilian use this year. Lt. Col. A. L. Ahnfeldt, Office of the Surgeon General, states, "D.D.T. will be to preventive medicine what Lister's discovery of antiseptics was to surgery." Already the army has checked a typhus epidemic in Naples using the D.D.T. compositions. It should be stated here also that the staff of 29 research workers at the Orlando, Florida experiment station worked unheard of hours in order to have the material ready for the Italian campaign. For the first time in history a mid-winter typhus epidemic was stopped after dusting approximately 2,225,000 persons with D.D.T. compositions. The army developed dusters for the dusting of clothing without removal thus making the mass protective measures possible with a minimum of equipment. It was also found that underwear impregnated with a special solution of D.D.T. will remain free of lice for as long as two months even though it is washed once a week.

(Continued on page 20)

D.D.T.

(Continued from page 9)

D.D.T. is being used in the Pacific Theater to protect men from the dreaded malaria carrying mosquito which has taken a tremendous toll of men in other wars, and also to control various other tropical insects.

PRODUCTION

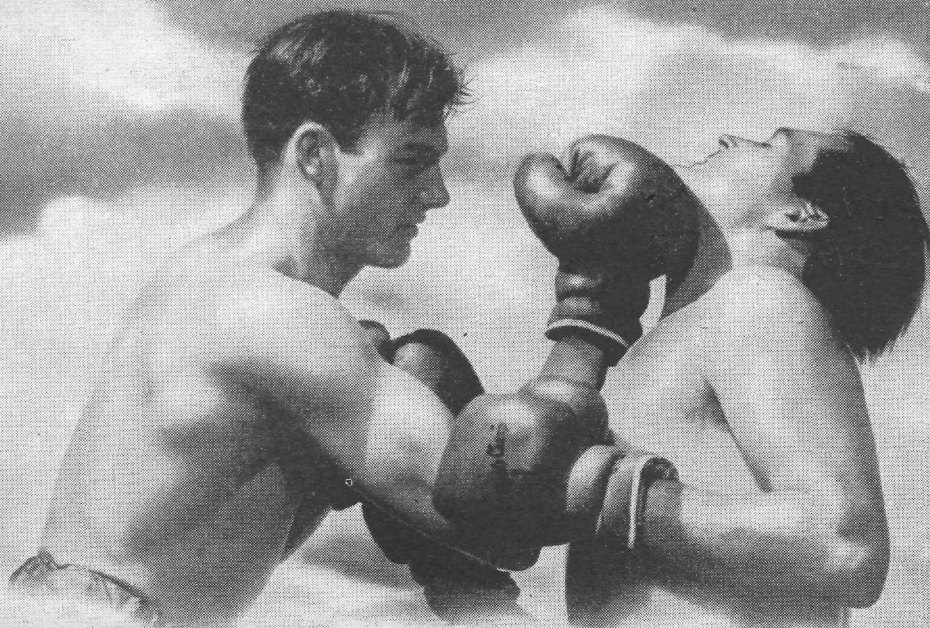
D.D.T. was prepared by Zeidler in 1874 by allowing anhydrous chloral and chlorobenzene to react in the presence of concentrated sulfuric acid. At present D.D.T. is being manufactured by a batch process which is basically the same as that used by Zeidler in 1874.

Production in the middle of 1943 was 0.5 tons per month of D.D.T. This was increased to 750 tons per month during September 1944 with a goal of 950 to 1000 tons per month in 1945.

The sudden demand for D.D.T. has naturally caused much investigation on improvement of the manufacturing process. A. Brothman and E. Z. Barish, now of A. Brothman and Associates, New York, realized that by converting the D.D.T. batch process to a continuous one, the production could be increased and the manufacturing cost lowered as well as insuring a more uniform product. These engineers investigated Zeidler's batch process thoroughly, both mathematically and experimentally, and developed continuous processes for manufacturing and purifying both D.D.T. and chloral. The processes were demonstrated in pilot plant operations during 1944, and it is expected

(Continued on page 28)

Television broadcasts of boxing at Madison Square Garden, New York City, are brought to you exclusively by NBC over Station WNBT.



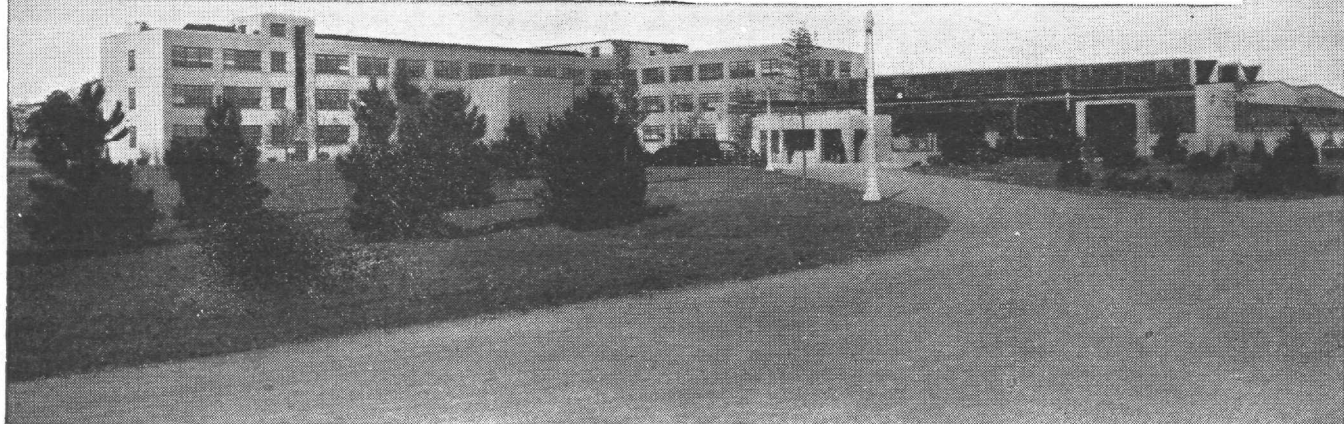
TELEVISION—THE “RINGSIDE SEAT”!

● Just as RCA pioneered in television to bring you exciting events such as prize fights, so has RCA research made possible a greatly improved super-sensitive television camera.

Earlier television needed a mid-day sun—or blinding artificial light—to illuminate the scene. Many performances could not be televised, and many outdoor day-time events would fade off the screen as the afternoon light waned.

But now, through RCA research, the television camera will faithfully reproduce every detail, every shadow, as long as there is enough light for the spectators themselves to see by.

Besides, it can bring you opera, drama, ballet—direct from the theater during the actual performance. Great new television thrills are in store for you! As soon as possible, RCA will make available the finest in television equipment.



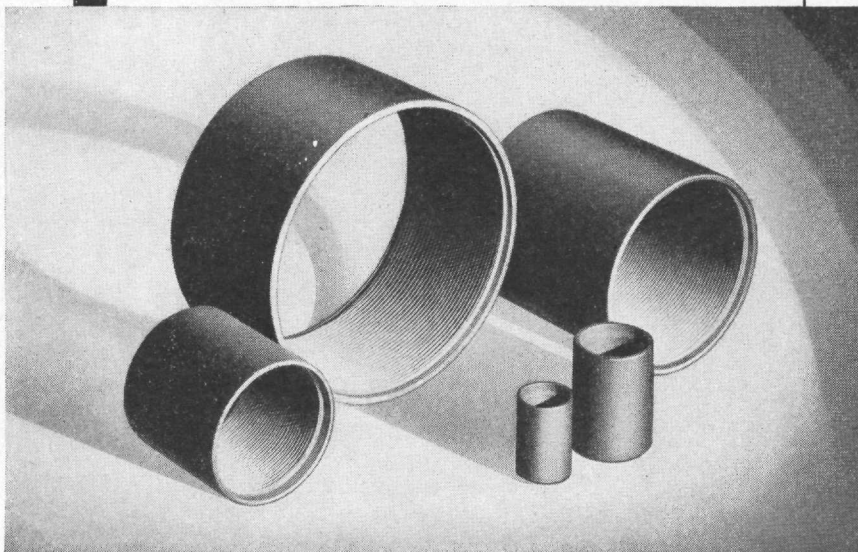
RADIO CORPORATION OF AMERICA
RCA LABORATORIES • PRINCETON • NEW JERSEY

RCA
leads the way in
radio—television—
phonographs—records
—tubes—electronics



Listen to RCA's "The Music America Loves Best"—Sunday, 4:30 P.M., E.W.T., over the NBC Network ★ BUY WAR BONDS EVERY PAY DAY ★
February, 1945

The Name
Harrisburg
assures you of Quality
**SEAMLESS STEEL
 COUPLINGS**



Harrisburg Seamless Steel Pipe Couplings are forged from steel made in Harrisburg's own open hearth furnaces—threads are accurate of form, height, angle and lead. The same high quality found in Harrisburg Couplings are reflected in all other Harrisburg products.

Harrisburg Makes: Alloy and Carbon Steel; Seamless Steel Cylinders, Liquefiers, Pipe Couplings and Slush Pump Liners; Drop Forgings and Drop-Forged Steel Pipe Flanges; Coils and Bends.

This Catalog is a must if you are interested in Seamless and Drop-Forged Steel Products. Indexed, glossarized and departmentalized, it is a veritable text-book for



the expert or apprentice. Quick reference dictionary of our products, which gives accurate, illustrated descriptions and other valuable information.

HARRISBURG STEEL CORPORATION
 HARRISBURG, PENNSYLVANIA



Mrs. Zeke dashed to her husband's place of work which happened to be a coal yard. There she saw Zeke standing. She ran up to him and said, "Zeke, are you all right? I was told that five tons of coal had fallen on you."

"Sure I'm all right. It was only some soft coal."

* * *

If it's funny enough to tell, it's been told.

If it hasn't been told, it's too clean, and

If it's dirty enough to interest an Engineer,

The editor gets kicked out of school.

* * *

A pink elephant is a beast of bourbon.

* * *

Pledge (at dinner table): "Must I eat this egg?"

Brother: "Yer damn right!"

Silence——

Pledge: "The beak, too?"

* * *

Newton's thirty-third law: The dimmer the porch light, the greater the scandal-power.

D.D.T.

(Continued from page 20)

that at least one large commercial plant will soon be producing D.D.T. and chloral by the Brothman continuous processes.

It is estimated that the cost of D.D.T. and chloral plants designed for production of 100 tons per month of D.D.T. and 44 tons per month of chloral would be \$211,000. \$28,000 of this sum is for processing equipment for the D.D.T. plant and \$27,000 for processing equipment for the chloral plant.